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EXAMINER				
CORRIELUS, JEAN B				
ART UNIT		PAPER NUMBER		
2611				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/595,128

Applicant(s)

PRATT ET AL.

Examiner

Jean B. Corrielus

Art Unit

2611

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2006 and 21 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4-8, 10-30, 96 and 97 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-8, 10-30, 96, 97 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/10/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 23-30 are rejected under 35 U.S.C. 101 because

The claimed invention is directed to non-statutory subject matter. Claim 23 when taken as a whole is directed to a signal per se. **Signal per se** however is non statutory subject matter. The same analysis applies to claim 24-30.

3. Claims 1, 4-8, 10-30 and 97 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent¹ and recent Federal Circuit decisions² indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim recites a series of steps or acts to be performed, the claim neither transforms underlying subject matter nor is positively tied to another statutory category that accomplishes the claimed method steps, and therefore does not qualify as a statutory process. For example, with respect to claim 1, the method including steps of multiplying is of sufficient breadth that it would be reasonably interpreted as a series

¹ *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

² *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

of steps completely performed mentally, verbally or without a machine. The claim fails to recite any corresponding hardware in combination with the method step(s) so as to effectively tie the process claim with a statutory class of invention, i.e. a specific apparatus. Claims 4-8, 10-30 and 97 are likewise rejected.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 96 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 96 recites a receiver comprising “means for processing. Such claim, consequently, is considered as a single means since the means for processing does not seem to appear in combination with another recited element of means. Consequently, such claim is held nonenabling. See MPEP 2164.08(a).

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 5-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claim 5, "the plurality of subcarrier modulation signals" lacks of proper antecedent basis. Claims 6-7 are likewise rejected because of their dependency to claim 6.

Claim Objections

8. Claims 5-7, 11-22, 24-26 and 96 are objected to because of the following informalities: Claim 5, line 3, "predeterminable" should be replaced by a positive limitation such as "predetermined". Claim 11 recites "subcarrier" while claim 1 recites "subscriber" the same comment applies to claim 18. claim 12 recites "multiple amplitudes" while claim 1 recites "a number, m, of amplitude levels". Claim 13 recites "amplitudes" and "subcarrier" while claim 1 recites "a number, m, of amplitude levels" and "subscriber", the same comment applies to claims 15-16. Claim 24 recites "plurality of signal amplitudes" while claim 23 recites "m signal amplitudes". Please correct for consistency. Claim 96, "to process" should be replaced by "for processing. Note that any claim whose base claim is objected is likewise objected. Appropriate correction is required.

Specification

9. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction

of the following is required: there is no antecedent basis in the specification for "computer readable storage" as recited in claim 97.

10. In addition, the specification page 7, line 13 refers to appendix A. However, such document is not of record. It appears that the application is incomplete.

Oath Declaration/ Application Data Sheet

11. Applicant fails to identify the international application in the oath/declaration and/or data sheet.

Information Disclosure Statement

12. Please submit a copy of the document incorporated by reference in the specification. See page 7, lines 4-5.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claims 1, 4, 23 and 96 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe US Patent No. 5,684,833.

As per claim 1, Watanabe discloses a method and apparatus comprising multiplying a carrier signal by a modulation signal, the modulation signal comprising m amplitude levels, where $m > 2$ note 17, lines 9-10 and col. 8, line 49.

As per claim 4, Watanabe teaches that the number of levels is 9.

As per claim 23, see claim 1.

As per claim 96, Watanabe teaches that the system includes a receiver comprising means for processing a signal see fig. 7.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe 5,684,833 in view of Dahan et al US patent Application Publication No. 2002/0070799.

As per claims 5-6, as applied to claim 1 above, Watanabe teaches every feature of the claimed invention but does not explicitly teach the use of triangular wave as a basis waveform. As shown in at least in the drawing (see front page of the publication, note input to summer 35), it is well known in the art to use a triangular wave as a basis waveform. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in Watanabe in order to provide Watanabe with the capability to generate desired carrier signal necessary to modulate the signal prior to transmission because, as known in the art, prior to any transmission, a signal has to properly modulated with a carrier so as to ensure proper transmission.

As per claim 7, the combined references teaches every feature of the claimed invention, but does not explicitly teach the additional limitations of selecting the waveform according to a desired power distribution characteristics of the transmission

signal. However, selecting the waveform according to a desired power distribution characteristics of the transmission signal would have been in the purview of one skill in the art. Given that it would have been obvious to one skill in the art to select the waveform according to a desired power distribution characteristics of the transmission signal so as to ensure that negative effect of the transmission medium is compensated for in order to improved integrity of the transmission system.

17. Claims 8, 10, 11, 12 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe 5,684,833 in view of Poklemba et al US Patent Application publication No. 20030141938.

As per claim 8, as applied to claim 1 above, Watanabe teaches every feature of the claimed invention but does not explicitly teach the further limitation of providing at least two mutually orthogonal subcarrier modulation signals. Poklemba et al teaches a carrier generator for generating two carrier signals $\cos wct$ and $\sin wct$ separated by a phase shift of 90 degrees. Given that fact, one skill in the art would have been motivated to generate a pair of carrier signals in the manner taught by Poklemba et al so that interference can be minimize since orthogonal carriers will ensure that the signals are separated from each other in such a way no interference can be created.

As per claim 10, Poklemba et al teaches that the carriers are separated by a predetermined phase, 90 degrees. One skill in the art would have been motivated to use such a phase shift for the reason provided with respect to claim 8 above.

As per claim 11, the Poklemba et al show an inphase carrier coswct an inphase carrier sinwct see the drawing. One skill in the art would have been motivated to use such carriers in Watanabe for the same reasons provided above with respect to claim 8.

As per claim 12, it would have been obvious to one skill in the art to determine the multiple amplitudes of the inphase and quadrature carriers to maintain a constant transmission signal envelope and the motivation to do so would have been to ensure that the signal level is maintained within the operational range of the amplifier that may be used to transmit the signal.

As per claim 25, see claim 10.

As per claim 26, see claim 11.

18. Claims 13-22, 24, 27-30 and 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe 5,684,833.

As per claim 13, as applied to claim 1 above, Watanabe teaches every feature of the claimed invention but does not explicitly teach the further limitation of deriving the amplitudes from a plurality of phase states. However, selecting the amplitudes from a plurality of phase states would have been in the purview of one skill in the art as such would have enabled the amplitude of the signal that fit predetermined criterion so as to generate only desired modulated signal.

As per claim 14, providing phase states that are equally angularly distributed around the unit circle would have been in the purview of one skill in the art for the reason provided above with respect to claim 13.

As per claim 15, providing amplitudes of equal duration would have been in the purview of one skill in the art for the reason provided above with respect to claim 13.

As per claim 16, providing amplitudes of unequal duration would have been in the purview of one skill in the art for the reason provided above with respect to claim 13.

As per claim 17, it would have been obvious to one skill in the art to quantize the durations according to an associated clock signal so as to satisfy requirement of the system.

As per claim 18, it would have been obvious to one skill in the art to define the associated phase states according to mutually orthogonal axes so as to ensure that interference between the carrier signals is minimized.

As per claim 19, it would have been obvious to one skill in the art to associate the phase states with ranging signals so that the system can be used in radars that use ranging signals.

As per claim 20, it would have been obvious to one skill in the art to use unequal dwell times in the phase states for the reason provided above with respect to claim 13.

As per claim 21, it would have been obvious to one skill in the art to use a first dwell time for a first group of phase states and a second group of dwell time for a second group of phase states for the same reason provided above with respect to claim 13.

As per claim 22, see claim 17.

As per claim 24, see claim 13.

As per claim 27, see claim 17.

As per claim 28, it would have been obvious to one skill in the art to select a set of amplitude that includes "+1,+1/sqrt2, 0, -1/sqrt2, -1" so as to ensure that the signal envelope remains within a desired level.

As per claim 29, the combined references teach every feature of the claimed invention, but do not explicitly teach the additional limitations of selecting the signal amplitude to achieve a predetermined magnitudes characteristics of the transmission signal. However, selecting the signal amplitude to achieve predetermined magnitudes characteristics of the transmission signal would have been in the purview of one skill in the art. Given that it would have been obvious to one skill in the art to select the signal amplitude to achieve predetermined magnitudes characteristics of the transmission signal so as to ensure that negative effect of the transmission medium is compensated for in order to improved integrity of the transmission system.

As per claim 30, it would have been obvious to one skill in the art to use a constant envelope of the transmitted signal as the predetermined magnitude characteristics and the motivation to do so would have been to ensure that the signal level is maintained within the operational range of the amplifier that may be used to transmit the signal.

As per claim 97, it would have been obvious to one skill in the art to use implement the invention using a computer readable medium in order to be able to implement the invention via software so as to reduce production cost since hardware use would have been minimized.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on Monday-Thursday from 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jean B Corrielus/
Primary Examiner
Art Unit 2611